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(MERCURY, pois.
occup., prev. (Cz))
(OCCUPATIONAL DISEASES, prev. & control
mercury pois. (Cz))

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clin. exam. of workers manufacturing silicon carbide (Cz))
(SILICON,
silicon carbide workers, clin. exam. (Cz))

CZECHOSLOVAKIA
6 Aug 66

KVASNICKA, R.

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Prague, Collection of Czechoslovak Chemical Communications, No 10, October 1966, 4172-4175

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FLEISHHANS, Bohuslav, Dr.; NEUMANN, Miroslav, Dr.; KLIMA, Jaroslav, Dr.;
BARTA, Vladimir, MUC; KVASNICKA, Vladimir, MUC; MAXA, Miroslav, MUC

Chronic bronchitis and pulmonary emphysema in farmers. Cas. lek. cesk. 94 no.7:158-163 11 Feb 55.

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(OCCUPATIONAL DISEASES
bronchitis & pulm. emphysema in agriculture)
(AGRICULTURE
bronchitis & pulm. emphysema in farmers)
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in agricultural workers)
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ECG in right ventric. hypertrophy in chronic pulm. heart dis. (Cz))

(ELECTROCARDIOGRAPHY, in various dis.
right ventric. hypertrophy in chronic pulm. heart dis. (Cz))

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ECG in right ventric. hypertrophy in chronic pulm. heart dis. (Cz))

PELIKAN, V.; KVASNICKOVA, D.

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in No. Koreans, late remissions in course of other dis. (Cz))

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Surveying and evaluation of health as basic objectives of industrial physician. Pracovni lek. 6 no.6:365-367 15 Nov 54.

(INDUSTRIAL HYGIENE
exam. & evaluation of health of workers as task of indust. physician)

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indust., task of exam. & evaluation of health of workers)

ERBEN, Josef, GROH, Jindrich, LOMSKY, Radovan; SVAB, Jozef; HEROUT, Vladimir; NOZICKA, Zdenek; KVASNICKA, Jiri; BARTOS, Vladimir; KVASNICKOVA, Eva. Technicka spoluprace :SCHROFLOVA, A.

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A3finv.R
D4.R

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Source: Vestnik Vysshey Shkoly, No. 3, 1951, pp.58-59.
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(Gas turbines)

AUTHOR: Kvasnikov, ', A.V. SOV/147-58-1-12/22

TITLE: An Evaluation of the Internal Losses in the Combustion Chamber of a Jet Engine (Otsenka vnutrennikh poter' v kamere ZhRD)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Aviatsionnaya Tekhnika, 1958, Nr 1, pp 95 - 105 (USSR)

ABSTRACT: The method of evaluation proposed is based on a thermo-dynamic calculation and simple experimental definitions. Due to the formation of mixtures and interaction with the walls of the chamber and the exhaust pipe, which give rise to different states at differnt cross-sections of the chamber, there are side effects imposed on the ideal gas cycle. These side effects are irreversible and lead to energy and thrust losses (internal losses). It may be supposed that from experiment, the consumption of the fuel, the pressure and the thrust are known very accurately in the combustion chamber. From this and the data of thermo-dynamic calculations, it is possible to give a useful evaluation of the main losses in the combustion chamber. It is assumed that the velocity of the gas is small and the pressure is constant.

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SOV/147-58-1-12/22

An Evaluation of the Internal Losses in the Combustion Chamber of a Jet Engine

There are 5 figures and 1 table

ASSOCIATION: Moskovskiy aviatsionnyy institut (Moscow Aviation Institute)

SUBMITTED: November 5, 1957

Card 2/2

1. Jet engines--Equipment 2. Combustion chambers--Performances

26(1,5) PHASE I BOOK EXPLOITATION SOV/3286

Kvasnikov, Aleksandr Vasil'yevich, Professor

Teoriya zhidkostnykh raketnykh dvigateley, ch. 1 (Theory of Liquid-Fuel Rocket Engines, pt. 1) Leningrad, Sudpromgiz, 1959. 542 p. 8,400 copies printed.

Resp. Scientific Ed.: I. I. Kulagin; Ed.: Ye. A. Krugova; Tech. Ed.: N. V. Erastova.

PURPOSE: This textbook is intended for students in aeronautical vuzes specializing in rocket engines; it will also be of interest to engineers working in the field of rocket engineering.

COVERAGE: The book deals with the fundamentals of the theory of liquid-fuel rocket engines, compares liquid-fuel rocket engines with other types of heat engines, and considers possible fields of application. Use of the book presupposes a knowledge of thermodynamics, gasdynamics, and heat transfer at the vtuz level. Special attention is given to the working processes in the engine chamber and the characteristics of these processes,

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and to the theory of liquid-fuel rocket-engine chambers with complex cycles. Actual data and figures are taken from published Soviet and non-Soviet literature. The book presents coefficients which characterize the internal losses in the liquid-fuel rocket-engine chamber and coefficients which evaluate the liquid-fuel rocket engine as a propulsive engine. The author thanks the senior instructor of MAI (Moscow "Order of Lenin" Aviation Institute) L. L. Klochkova, who performed calculations, compiled informative data, and worked directly on the basic content of the book, particularly the chapter "Thermodynamic Calculation of Liquid-Fuel Rocket Engines". The author also thanks engineer V. V. Kuznetsov who performed a considerable part of the calculations and graphical work in the book, and laboratory technician R. I. Gurevich. There are 10 Soviet references.

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APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000928310014-3"

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Theory of Liquid-Propellant Rocket Engines. Wright-Patterson Air Force Base, Liaison Office Technical Information Center, 1960.
2 v. in 1 (607 p.) illus., diagrs, graphs, tables. (MCL-630/V)
Translated from the original Russian: Teoriya Zhidkostnykh Raketnykh Dvigateley, Leningrad, 1959.
Includes Bibliographies.

SHEVELYUK, Mikhail Ivanovich; KVASNIKOV, A.V., prof., doktor tekhn.nauk, retsenzent; YANOVSKIY, I.L., inzh., red.; BOGOMOLOVA, M.F., izdat. red.; PUKHLIKOVA, N.A., tekhn.red.

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(Liquid propellant rockets)

25122
S/535/60/000/119/007/009
E194/E435

26.1220

AUTHOR: Kvasnikov, A.V., Professor

TITLE: The regeneration of heat in liquid fuel rocket engine

PERIODICAL: Moscow. Aviatsionnyy institut. Trudy, No.119, 1960. Rabochiye protsessy v teplovykh dvigatel'nykh ustanovkakh, pp.124-142

TEXT: In a liquid fuel rocket engine, during and at the end of the expansion time, the temperature of the working substance is appreciably higher than in ordinary heat engines which use atmospheric air as working substance. On the other hand, in the rocket engine when the working substance is taking in heat, its temperature is lower, moreover in its initial condition the working substance is liquid. Accordingly, in the heat cycle of a rocket engine, the thermodynamic conditions for heat regeneration are more favourable than in ordinary engines in which regenerative heat exchange usually precedes compression. The theoretical considerations that follow are based on the following assumptions: in the gas phase of the cycle, the gas is ideal; there are no heat losses in the chamber except cooling losses. The characteristics of the following three kinds of cycles are compared

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theoretically: an ideal cycle without cooling (or adiabatic chamber); a cycle in which the chamber is cooled by an external cooling agent (chamber with external cooling); a cycle with regenerative cooling of the chamber. Because of cooling, the gas temperature at the end of the chamber is lower and expansion takes place with heat loss. For each of the cases described the temperature-entropy diagrams are constructed and efficiency equations are derived. Equations are also derived for the specific thrust which is defined as the rate of flow of gas from the chamber divided by the acceleration of gravity. In the case of a regeneratively cooled combustion chamber, these equations show that the heat lost in the walls of the chamber head is compensated by its being returned to the chamber together with the working substance. Consequently, the efficiency, specific work and specific thrust of the chamber with a cooled head are higher than for the corresponding ideal cycle. If heat regeneration replaces nozzle-jacket cooling, the improvement in efficiency and thrust are quite appreciable. Thus if the ratio of the heat extracted from the nozzle to the enthalpy of the gas at the start of expansion is 0.02 the use of regenerative cooling increases the chamber

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efficiency by 2% and the thrust by 1%, values which are commensurate with those which are obtained, for example, when allowing for frictional losses in the nozzle or for the gas jet not being parallel on leaving the nozzle. The importance of regenerative heat exchange increases with the size of the chamber and with increase in the ratio of its length to diameter when a relatively large amount of heat is transferred to the cooling jacket. The relative increase in chamber efficiency is greater when the fuel is of low calorific value. Regeneration of nozzle jacket heat can give a cycle which is better than the adiabatic. Regenerative cooling gives appreciable advantages as compared with cooling by an outside substance, particularly in small chambers. External regeneration is then considered in more detail. It is defined as regeneration of gas heat after expansion in the nozzle duct. In this case the regenerator usually follows immediately beyond the nozzles. It is first assumed that: there are no hydraulic losses in the chamber or regenerator; the heat expended is applied to the working substance from outside; the speed and pressure of gas in the regenerator remain unaltered. Again temperature entropy diagrams are constructed and
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efficiency and thrust equations are derived. It is found that the regenerator increases the initial temperature of expansion as well as the useful work and thrust of the chamber. Obviously, the increase in the specific thrust depends on the degree of regeneration. Bearing in mind that the cooling agent must be fuel, this means that the increase in thrust depends upon the cooling capacity of the fuel. The cooling capacity of the fuel is assessed as the ratio of the limiting amount of heat that the fuel can take up in the cooling jacket of the regenerator to the calorific value of the fuel. Information is given about the initial degree of regeneration and the cooling capacity of the following fuels: oxygen and 70% ethyl alcohol; nitric acid and kerosene; nitric acid and 96% alcohol. Addition to the fuel of an inert substance of high cold capacity is then examined. If the inert substance is added to the fuel initially, it is concluded that regeneration of this kind is justified only when the inert substance is much more easily available than the fuel. However, if the rocket moves in a suitable medium, the inert substance for the regenerator may be obtained from outside rather than being contained in the rocket tanks. Comparison of rockets in respect of take-off speed and
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effective range shows that the possibility of using an external inert substance greatly increases the importance of regenerative cycles. The following cases may be considered as typical of systems with external inert substance: motion of a body under water; delivery to the regenerator of working substance for a turbo-pump; use of the regenerated heat in a combined engine when, for instance, the heat is transmitted to air under compression. The advantages of regeneration increase as the consumption of the rockets own mass is reduced and this will particularly apply to atomic engines. On the basis of consideration of conditions of regeneration, the following conclusions are drawn.
(1) The thermodynamic conditions for a cycle with external regeneration are much more favourable in a rocket engine than in cycles with compression. (2) The chamber efficiency and also (provided that the chamber temperature is increased) the specific thrust are increased when a regenerative cycle is used and the more so as the degree of expansion in the cycle is reduced and the degree of regeneration increased. (3). The use of fuel components as cooling substance in the regenerator gives relatively small changes in efficiency and specific thrust (4 to 7%) because of the small
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cold capacity of these components. (4) When the fuel is cooled by an inert substance within the expansion range of 20 to 80, with relative heat losses of 0.1 to 0.5, the thrust may be greater than that corresponding to adiabatic conditions by 2 - 4 to 15 - 25%; in this case (a) if the maximum temperature in the chamber is maintained, the use of a regenerative cycle does not reduce the specific fuel consumption; (b) the use of inert heat carriers in the regenerator may lead to some small increase or reduction in the specific thrust depending upon the type of fuel and inert substance ; (c) the consumption of the calorific part of the fuel per unit thrust and during acceleration of the rocket to the ultimate speed may be considerably reduced when the regenerative cycle is used. (5) The use of an external inert substance, when the expansion is in the range 20 to 80, the relative heat loss is 0.1 to 0.5, and the ratio of rocket speed to gas speed is 0.1 to 0.5, reduces the thrust as compared to that corresponding to adiabatic conditions by 1 to 15%. Bearing in mind the conditions of origination of gas-dynamic losses, it can be confidently affirmed that the use of external regeneration alone is not advisable. In

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this case the inlet part of the regenerator will be in the supersonic part of the flow and losses will be considerable. Numerical examples show that external regeneration can give economy of fuel consumption but this is accompanied by relatively high frictional losses. Methods of reducing the frictional losses are then briefly considered and it is concluded that external regeneration can only be justified when the frictional heat is recovered, as for instance in combined engines. There are 12 figures and 2 tables.

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(Thermodynamics)

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Establishing the smallest possible radius for a circular curve on narrow-gauge (250mm) railroads. Torf.prom. 35 no.8:13-16 '58. (MIRA 11:12)

1. Institut inzhenerov zheleznodorozhnogo transporta imeni akademika V.N. Obraztsova.
(Railroads--Curves and turnouts)

KVASNIKOV, B.N., kand.tekhn.nauk (Leningrad)

Maintenance of switches under high-speed traffic conditions. Put' i put. khoz. 7 no.4:19-21 '63. (MIRA 16:3)

(Railroads—Switches)

KVASNIKOV, B. V.

OSNITSKAYA, E. A. /Co-author/ See: KVASNIKOV, B. V. "On Resistance of Cabbage Varieties to Club Root," 1950.

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2

The significance of varietal peculiarities in the formation of tubercles in legumes for the succeeding crop. B. V. Kvasnikov and S. T. Dolgikh. *Agrobiologiya* 1955, No. 6, 102-11.—Eighteen varieties of peas and 11 varieties of beans have been examd. for variations in intensity of formation of tubercles in relation to yield. It was found that in the flowering stage the N content of the tubercles of peas varied from 5.38 to 6.89%; in beans, 6.05–6.93 and 5.52–6.87%. At maturity the N content of early peas was 3.32–4.73%; of late peas, 3.71–5.63%; early varieties of beans, 4.04–4.90%; late beans, 4.09–4.69%. The plants that have developed an intensive tubercle yield contain more N in the vegetative parts. There was also a difference in N content in the vegetation during the flowering stage and the maturity of beans and peas, higher in the former. The N content of the soil also increased when the tubercle yield was high.

I. S. Ioffe

KVASNIKOV, B. V.

62 Significance of assimilative organs and root system for the receptivity of legumes to nodule bacteria. B. V. Kvasnikov and S. T. Dolgikh (Vegetable Econ. Sci. Research Inst., Moscow). *Mikrobiologiya* 24, 180-7(1955).—Response of legumes to nodule bacteria depends on the root system, not on assimilative organs; but these organs actively influence growth of the bacteria. In particular, the more active the carbohydrate assimilation in the plant, the better the nodule bacteria develop. Increased nodule formation and greater yield of monosaccharides in the plant seem to coincide.

Julian F. Smith

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KVASNIKOV, B.V., DOLGIKH, S.T., LEBEDYANTSEVA, O.N.

Carbon and nitrogen content of varieties of table peas and lima beans distinguishable by the difference in intensity of tubercle formation [with summary in English]. Mikrobiologiia 27 no.5:599-604 S-O '58 (MIRA 11:12)

1. Nauchno-issledovatel'skiy institut ovoshchnogo khozyaystva, Moskva.
(LEGUMES)
(RHIZOSPHERE MICROBIOLOGY)

KVASNIKOV, B.V., prof., doktor sel'skokhoz.nauk, red.; TAIROVA, V.N., red.; GUREVICH, M.M., tekhn.red.

[Vegetable growing] Vyrashchivanie ovoshchei; sbornik statei. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1959. 619 p. (MIRA 13:7)

1. Nauchno-issledovatel'skiy institut ovoshchnogo khozyaystva (Moskovskaya oblast', stantsiya Perlovskaya, poselok Grachi) (for Kvasnikov).

(Vegetable gardening)

TIMOFEYEV, Nikolay Nikolayevich, prof.; VOLKOVA, A.A., dotsent; CHIZHOV, S.T., dotsent; EDEL'SHTEYN, V.I., pochetnyy akademik, retsenzent; KVASNIKOV, B.V., prof., retsenzent; GRACHEVA, V.S., red.; BALLOD, A.I., tekhn.red.

[Vegetable breeding and seed production] Selektsiia i semenovodstvo ovoshchnykh kul'tur. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1960. 478 p. (MIRA 14:2)

1. Vsesoyuznaya akademiya sel'skokhozyaystvennykh nauk im. V.I. Lenina (for Edel'shteyn).

(Vegetables)

KVASNIKOV, B.V., doktor sel'skokhoz.nauk, red.; SAVZDARG, V.E., red.; PEVZNER, V.I., tekhn.red.; GOR'KOVA, Z.D., tekhn.red.

[Vegetable crops] Ovoshchnye kul'tury. Izd.2., ispr. i dop. Moskva, Gos.izd-vo sel'khoz.lit-ry, 1960. 535 p.

(Vegetables) (MIRA 13:11)

KVASNIKOV, I. A.

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1790
AUTHOR KVASNIKOV, I.A.
TITLE On the Application of a Variation Principle in ISING'S Model of the Ferromagneticum.
PERIODICAL Dokl.Akad.Nauk, 110, fasc.5, 755-757 (1956)
Issued: 12 / 1956

The present work gives a derivation of an approximation expression of the statistical sum $Z = \sum_{\sigma_1 = \pm 1, \ldots, \sigma_k = \pm 1} e^{-E/\theta}$ for any temperature on the basis of the variation principle by N.N.BOGOLJUBOV. The variation principle says that the HAMILTONIAN $E = -(1/2) \sum_{i \neq j}^{N} J_{ij} \sigma_i \sigma_j - \mu H \sum_{i=1}^{N} \sigma_i$ is split into two parts E_0 and E_1 in such a manner that the mentioned statistical sum can be computed with more or less ease. On this occasion parameters can enter E_0 and E_1, which are then defined. Next, an expression for the upper limit of free energy is given. The separation parameters entering into E_0 and E_1 are determined from the minimum condition of the upper limit of free energy. Next, the application of the described variation principle is examined step by step for the case at issue. The solution obtained here is compared here with the results obtained by other authors for the cases of high and low temperatures. On the occasion of

Dokl.Akad.Nauk,110,fasc.5, 755-757 (1956) CARD 2 / 2 PA - 1790

the derivation of an expression for magnetization an expression is obtained here which agrees with the phenomenological theory by WEISS.
Here ϱ denotes the number of lattice nodes in the volume unit, and $I = M\varrho$ - the magnetization referred to the unit of volume.
Thus it was possible, with the help of ISING'S rough model and by using BOGOLJUBOV'S variation principle, to compute an approximation expression for the statistical sum. This sum describes the macroscopic properties of a ferromagneticum within the entire temperature intefval. The formula obtained here does not only describe the qualitative peculiarities of a ferromagnetic crystal, but it furnishes (to the same extent as the phenomenological theory) a quantitative agreement with experimental data. Beyond the results of WEISS' theory, a connection between the critical temperature and the microscopic characteristics J_{ij} was obtained. Assuming $T_o = 1047^o$ the sensible result $J = KT_o/c \sim 1,8.10^{-14}$ erg is obtained for iron (if the number of immediate neighbors for a body-centered lattice c 8 applies).

INSTITUTION: Moscow State University.

AUTHOR. KVASNIKOV, I.A.

PA - 3138

TITLE. On the Application of A Variation Principle to ISING'S Model of An Antiferromagneticum.
(O primenenii variatsionnogo printsipa k Izingovskoy modeli antiferromagnetika -Russian)

PERIODICAL Doklady Akademii Nauk SSSR, 1957, Vol 113, Nr 3, pp 544-547 (U.S.S.R.)
Received 6/1957 Reviewed 7/1957

ABSTRACT The ISING ferromagneticum is described by the HAMILTONIAN:
$H = (1/2) \sum_{ij}^{N} e\,(i - j)\, \sigma_i \sigma_j - h \sum_{i=1}^{N} \sigma_i$. Here i, j denote the numbers of the lattice nodes, e(i-j) -the orders of magnitude which characterize the interaction of the i-th and t-th spin, h - the magnetic field strength multiplied by BOHR'S magneton. σ_i takes on the values $\pm$ 1. This model, which describes an antiferromagneticum in a very rough manner, can be applied with greater justification for the description of order-disorder processes in binary alloys. If the statistical sum of the system is known, the free energy $F_A = - \theta \ln Z_A$ OF THE ALLoy belonging to the processes of order can be computed. The lower limit of the statistical sum is here used as an approximated expression for the statistical sum of the investigated problem. The system is here assumed to be divided into two sublattices, namely and even and an odd one. For the lower limit of the partial function an expression is explicitly written down. Relations which are identical with the equations of the theory of the inner molecular field are obtained for the magnetization

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On the Application of A Variation Principle to ISING'S Model of An Antiferromagneticum. PA - 3138

M. These equations in the general case can be solved only numerically. An approximation formula for the temperatures $\theta \sim 0$ is obtained for the sums of state. Also an expression is found for the heat capacity to the right of the Curie point. Within the paramagnetic domain energy does not depend upon temperature.
In the antiferromagnetic case the equation must be solved numerically, because the "magnetic field strength" h is not a small quantity. An exception to this is the case of a 50% alloy, where M = 0 applies.
(No illustration)

ASSOCIATION Moscow State University
PRESENTED BY BOGOLYUBOV N.N., Member of the Academy
SUBMITTED 26.6.1956
AVAILABLE Library of Congress
Card 2/2

AUTHOR KVASNIKOV I.A. 20-4-15/61

TITLE On the Application of the Variation Principle in the Problems of the Binary Alloy and of the Ising model (probably Ising model) (K primeneniyu variatsionnogo printsipa v zadachakh o binarnom splave i izingovskoy sisteme.- Russian)

PERIODICAL Doklady Akademii Nauk SSSR 1957, Vol 113, Nr 4, pp 777 - 779 (USSR)

ABSTRACT The paper under review decomposes the Hamiltonian of the antiferromagneticum with the aid of the Bogolyubov variation principle in the following way: a part of the terms from $\mathcal{H}_1$ is taken into $\mathcal{H}_2$ only for the reason that it becomes possible to compute $Z_0 = Sp\{\exp(-\mathcal{H}_0)\}$

In $\mathcal{H}_0$ the terms of the interaction of the groups of the neighbouring nodes are computed; the interaction between these groups and the interaction with the distant neighbours remain in $\mathcal{H}_1$. The simplest way of selecting these groups is in form of node pairs. In order to simplify the computations, the interaction with the distant neighbours is neglected.

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20-4-15/61

On the Application of the Variation Principle in the Problems of the Binary Alloy and of the Izing model (probably Ising model)

The author gives in the paper under review the following Hamiltonian:

$$\mathcal{H} = \mathcal{H}_0 + \mathcal{H}_1 = (1/2)E\sum_{\langle ij\rangle} \sigma_i\sigma_j - B\sum_{i=1}^{N} \sigma_i$$

$$\mathcal{H}_0 = \sum_{l=1}^{N/2} \mathcal{H}_{2l},\quad \mathcal{H}_k = -(B-\beta_0)\,\sigma_k - (B-\beta_1)\,\sigma_{k+1} + \varepsilon\sigma_k\sigma_{k+1}$$

$\mathcal{H}$ stands for the Hamiltonian divided by the temperature Θ, B denotes the magnetic field strength divided by Θ (in units of the Bohr magneton), N stands for the number of the grid nodes, $E = e/\Theta$ denotes the exchange integral divided by the temperature. In this computation all nodes of the grid are considered to be in equal position. β_0 and β_1 are variation parameters which are related to the two subgrids. The parameter ε characterises the effective interaction of the pair of the closest, neighbouring nodes. In this computation the variation parameters β_0, β_1 and ε are determined from a system of transcendental equations.

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On the Application of the Variation Principle in the Problems of the Binary Alloy and of the Izing model (probably Ising model)

Then the paper under review gives expressions for the magnetisation and for the mean thermodynamic energy per particle. According to these considerations, the mean energy and the thermal capacity of the alloy depend on the temperature:

$$\bar{E} = \frac{\varepsilon_0}{8} - \frac{e}{2} \operatorname{th} \frac{e}{\theta}, \quad C = \frac{\partial \bar{E}}{\partial \theta} = \frac{e^2}{2\theta^2} \left(1 - \operatorname{th}^2 \frac{e}{\theta}\right).$$

Finally the paper under review applies the scheme discusses here on the Izing (probably Ising) ferromagnetic system. (No reprod.)

ASSOCIATION: Moscow State University

PRESENTED BY: N.N. Bogolyubov, Member of the Academy, on 14. November 1956

SUBMITTED: 12. November 1956.

AVAILABLE: Library of Congress.

CARD 3/3

KVASNIKOV, I.A., Cand Phys-Math Sci--(diss) "Study of various statistical systems by means of the variation principle of N.N. Bogolyubov." Mos, 1958. 10 pp (Mos State U im M.V. Lomonosov. Physics Faculty), 150 copies. Bibliography at end of text (12 titles) (KL, 47-58, 130)

-5-

10(2)

AUTHOR: Kvasnikov, I.A. SOV/155-58-3-30/37

TITLE: Application of the Variation Principle for the Determination of the Equation of State of a Non-Ideal Classical Gas (Primeneniye variatsionnogo printsipa k nakhozhdeniyu uravneniya sostoyaniya neideal'nogo klassicheskogo gaza)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 3, pp 165-168 (USSR)

ABSTRACT: As is well-known, the calculation of the function of state

$$Z = \frac{1}{N!}\int_V \cdots \int_V \left(\frac{2\pi m\theta}{\hbar^2}\right)^{\frac{3}{2}N} e^{-\frac{U}{\theta}} dv_1 \ldots dv_N$$

of a non-ideal classical gas of N particles and with the volume V is difficult. The author uses the variation theorem of N.N. Bogolyubov and finds by approximating the energy U by a step curve

$$\ln Z = N\ln\left(\frac{2\pi m\theta}{\hbar^2}\right)^{3/2} + N\ln\frac{V-b}{N} + \frac{a}{\theta V} - N\frac{V}{b}\ln\left(1-\frac{b}{V}\right),$$

where m is the mole, $a = 2\theta_0 wN^2$, $b = Nw$, w is the volume of a

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Application of the Variation Principle for the Determination of the Equation of State of a Non-Ideal Classical Gas

SOV/155-58-3-30/37

gas molecule. Herefrom there follows the equation of state

$$(p + \frac{a}{V^2}) = N\theta \frac{1}{b} \ln \frac{V}{V-b} .$$

The estimation of the exactness of the proposed method is not possible. The author thanks the member of the Academy N.N. Bogolyubov for the guidance of the work, and V.V.Tolmachev for the discussion.

There are 2 Soviet references.

ASSOCIATION: Matematicheskiy institut imeni V.A.Steklova AN SSSR (Mathematical Institute imeni V.A.Steklov, AS USSR)

SUBMITTED: April 28, 1958

~~24(3)~~ 24.2200

66822

AUTHOR: Kvasnikov, I.A.

SOV/155-58-5-18/37

TITLE: The Application of the Variation Principle to the Antiferromagnetic System and to Ferrite Models

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 5, pp 91-101 (USSR)

ABSTRACT: The author investigates the thermodynamic properties of the antiferromagnetic model, the Hamiltonian of which possesses the form

$$(1) \quad H = -\sum_{i=1}^{N} (\vec{h}\ \vec{\sigma}_i) + \frac{1}{2} \sum_{\substack{ij \\ (i \neq j)}} I(i-j)(\vec{\sigma}_i\ \vec{\sigma}_j)$$

$\vec{h}$ is the external magnetic field multiplied with the elementary magnetic moment μ ; $\vec{\sigma} = (\sigma^x, \sigma^y, \sigma^z)$ are the spin operators of Pauli ; the magnitudes $I(i-j)$ characterize the Heisenberg interaction and are at least positive for next neighbors. The lattice is assumed to be ideal.

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The investigation of the system (1) is carried out with the aid of the variation principle formulated by N.N. Bogolyubov and gives the estimation of the statistical sum of (1). The results differ little from the phenomenological theory and confirm it from the microscopic point of view. The author thanks N.N. Bogolyubov, Academician for the guidance of the paper and V.V. Tolmachev and S.V. Tyablikov for discussion.
There are 6 references, 4 of which are Soviet, 1 American, and 1 French.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova (Moscow State University imeni M.V. Lomonosov)

SUBMITTED: September 7, 1958

4

Card 2/2

AUTHOR: Kvasnikov, I. A. 20-119-3-20/65

TITLE: ~~The Application of~~ a Variation Principle in the New Method of the Theory of Superconductivity (Primeneniye variatsionnogo printsipa v novom metode teorii sverkhprovodimosti)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 3, pp. 475-477 (USSR)

ABSTRACT: In a work on the new method in the theory of superconductivity N. N. Bogolyubov (ref. 1) investigates the model by J. Bardeen (Bardin) and constructs the Hamiltonian of an equivalent model-like dynamic system for the summation of a special class of diagrams. The term for the Hamiltonian, which results after some transformations is written down explicitly. Beginning with the variation principle by N. N. Bogolyubov the basic equations of the phenomenological theories by Weiss (Vayss) and Bragg-Williams (Vil'yams) can be obtained, whereby the mathematical procedures in both cases resemble each other very much. Here the author applies a method (ref. 4), which was developed by him, to the theory of the phase transition in a superconductor. After some transformations an equivalent Hamiltonian of the system is obtained, which

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resembles the Hamiltonian by Ising (Izing). For the superior limit of the free energy F a formula is given. Subsequently the behaviour of the specific heat of the system is examined. The corresponding formula for the temperatures, which are above the critical temperature, but yet sufficiently low, is written down. This specific heat corresponds with spefific heat of a free electron gas at low temperatures. At certain temperatures below the critical temperature the heat capacity has a singularity. At very low temperatures the specific heat decreases according to an exponential law. At the temperatures above the critical temperature the temperature increases according to a here given law. In case of decreasing temperature the entropy curve has a downward break at the critical temperature and the entropy exponentially tends towards zero in case of the temperature tending towards zero. Finally the author expresses his thanks to the member of the Academy N. N. Bogolyubov and V. V. Tolmachev for the discussion and the advice in the performance of the work. There are 5 references, 4 of which are Soviet.

The Application of a Variation Principle in the New Method of the Theory of Superconductivity 20-119-3-20/65

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova Akademii nauk SSSR (Mathematics Institute imeni V. A. Steklov AS USSR)

PRESENTED: November 18, 1957, by N. N. Bogolyubov, Member, Academy of Sciences, USSR

SUBMITTED: November 18, 1957

AVAILABLE: Library of Congress

Card 3/3

AUTHOR: Kvasnikov, I. A. 20-119-4-13/60

TITLE: The Application of a Variation Principle in the Theory of Superconduction (Primeneniye variatsionnogo printsipa v teorii sverkhprovodimosti)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 4, pp. 675 - 677 (USSR)

ABSTRACT: In a previous work (Reference 1) the author studies the thermodynamic properties of a system of superconduction on the basis of the new method developed by N. N. Bogolyubov (Reference 2) by means of a variation principle. The results obtained conveyed a good idea of the asymptotically accurate solution of the problem. In the present paper this variation principle is applied to a system the Hamiltonian H of which is of a more general form than that used in a previous work by N. N. Bogolyubov et al.(Reference 3). The author goes over to new Fermi operators by means of a canonical transformation. The Hamiltonian obtained hereby is explicitly written down and its components are discussed. During treatment of the aforementioned Hamiltonian by means of the variation method a part was found to be not essential, but the interaction of pairs of particles

with the opposite momenta and spins is of essential importance. The results found in this connection are asymptotically accurate for a simplified model of the superconductor. It must be borne in mind that these results are obtained by a suitable selection of a certain part H_0 of the Hamiltonian H. Similar conditions apply in the case of Heisenberg's and Ising's (Izing) model of an antiferromagneticum. In the case of a suitable selection of H_0 the variation principle in both cases led to the same results. In conclusion the author thanks N. N. Bogolyubov, Member, Academy of Sciences, USSR, and V. V. Tolmachev for discussing the problem with him and for their valuable advice. There are 4 Soviet references.

PRESENTED: November 30, 1957, by N. N. Bogolyubov, Member, Academy of Sciences, USSR

SUBMITTED: November 25, 1957

APPROVED FOR RELEASE: 06/19/2000 CIA-RDP86-00513R000928310014-3"

AUTHORS: ~~Kvasnikov, I. A.~~, Tolmachev, V. V. SOV/20-120-2-13/63

TITLE: On a Variation Principle in the Statistical Many-Body Problem (Ob odnom variatsionnom printsipe v statisticheskoy zadache mnogikh tel)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 120, Nr 2, pp. 273-276 (USSR)

ABSTRACT: In a previous paper N. N. Bogolyubov discussed the dynamic system of Fermi particles with pair interaction and he proposed using a new approximate variation method for the many-body problem. This method is a generalization of the well-known Fock method. It is interesting to formulate a statistical variation principle that may be applied to the determination of thermodynamic quantities at zero and non-zero temperatures. This paper endeavors to carry out this program. The authors investigate a system of Fermi particles with the Hamiltonian

$$H = \sum \left\{ T(f,f') - \lambda\delta_{f,f'} \right\} a_f^+ a_{f'} + \frac{1}{2} \sum J(f_1, f_2; f_2', f_1') a_{f_1}^+ a_{f_2}^+ a_{f_2'} a_{f_2'}$$

λ denotes the chemical potential, f- the set of the indices which define the state of one particle. With respect to J one may write $J(F_1, f_2; f_2', f_1') = -J(f_1, f_2; f_1', f_2') = -J(f_2, f_1; f_2', f_1')$

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The author then introduces new Fermi amplitudes by means of a canonical transformation $a_f = \sum_\nu (u_{f\nu}\, \alpha_\nu + v_{f\nu} \alpha_\nu^+)$. The coefficient functions u, v play the role of variation parameters. It is not sufficient to give one "test vacuum state", but it is necessary to know also the "test excitations." This is realized by choosing the following zero Hamiltonian $H = U+H_0+H_1$ with $U= \langle C_0^* H C_0 \rangle$, $H_0 = \sum_\mu E_\mu \alpha_\mu^+ \alpha_\mu$. E_μ denotes the difference between the energies of the excited state and the vacuum state C_0. Next, N. N. Bogolyubov's variation theorem is applied to the above mentioned variation principle. This variation theorem gives an estimation of the upper limit of the thermodynamic potential: $\Omega = -\theta \ln Sp e^{-H/\theta}$. The variation principle formulated in this paper gives the exact solution of a whole class of problems with a quadruple Hamiltonian. As an other example, the authors investigate more exactly the application of the statistical variation method to a system, the Hamiltonian of which contains only the interaction of particle pairs with antiparallel momenta. With this statistical variation principle the authors determine the critical temperature where the nuclear matter becomes liquid. At least the problem of the "stability" of the "normal" state of the

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On a Variation Principle in the Statistical Many Body Problem SOV/20-120-2-13/63

system is investigated. There are 4 Soviet references.

ASSOCIATION: Matematicheskiy institut im. V. A. Steklova Akademii nauk SSSR (Mathematics Institute imeni V. A. Steklov AS USSR)

PRESENTED: January 17, 1958, by N. N. Bogolyubov, Member, Academy of Sciences, USSR

SUBMITTED: January 15, 1958

1. Particles--Mathematical analysis 2. Thermodynamics --Mathematical analysis 3. Particles--Stability

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KVASNIKOV, I.A.

Application of a statistical variational principle to nondegenerate quantum systems. Trudy MFTI no.4:121-130 '59. (MIRA 13:9)
(Thermodynamics)

S/190/61/003/011/001/016
B124/B101

AUTHOR: Kvasnikov, I. A.

TITLE: Application of the Ising model in the statistical theory of high elasticity

PERIODICAL: Vysokomolekulyarnyye soyedineniya, v. 3, no. 11, 1961, 1617-1623

TEXT: The behavior of a rubber-like polymer chain unit in the highly elastic range is studied using the principles of statistical mechanics on the assumption that all chain links are equal in length and arranged in a way to form an angle of $\pi/2$, with only the directions of $\pm\pi/2$ being possible in two successive links. This means that only linear molecules arranged in a square lattice are discussed. The Hamiltonian of the studied model is written down; each link couple directed from the left to the right is characterized by the quantities $\sigma_i = +1$ ($i = 1,2,\ldots,N$; N = number of link couples) and $\sigma_i = -1$, respectively, when arranged in the opposite direction. The potential energy of each couple equals $-fl\sigma_i$, with f being the stretching force applied, and l the length of a single element. When only the nearest elementary couples are assumed to interact, the Ising Hamiltonian

$$H = -fl\sum_i \sigma_i + \varepsilon\sum_i \sigma_i\sigma_{i+1} + U \qquad (2)$$

holds for the interaction of two elementary couples. The chain length is determined by the series of numbers $\sigma_1, \ldots, \sigma_N$: $L = \sum_i \sigma_i$ (3). Thus, the initial problem could be reduced to the determination of the thermodynamic properties of a unidimensional discrete system provided that the above simplifications hold. For the medium length of a chain stretched by applying force f, the relation

$$\overline{L} = (1/Z)\sum_{\{\sigma_i\}}\sum_i \sigma_i e^{-H/\Theta} = \partial \ln Z/(\partial h/\Theta) \qquad (5)$$

holds, with $\Theta = kT$ being the temperatures given in units of energy.

$Z = \sum_{\{\sigma_i\}} e^{-H/\Theta}$ (4), and $h = fl$. For more complex models and high values of N: $Z^{1/N} = e^{-\varepsilon/\Theta} \operatorname{ch} h/\Theta + \sqrt{e^{-2\varepsilon/\Theta} \operatorname{sh}^2 h/\Theta + e^{2\varepsilon/\Theta}}$ (6), and for the relative stretching: $\lambda = \bar{L}/lN = (\operatorname{sh} h/\Theta)/\sqrt{\operatorname{sh}^2 h/\Theta + e^{4\varepsilon/\Theta}}$ and $h/\Theta = \ln\left\{\left[(Ne^{2\varepsilon/\Theta} + \sqrt{\lambda^2 e^{4\varepsilon/\Theta} + 1 - \lambda^2})\right]/\sqrt{1-\lambda^2}\right\}$ (7), respectively, hold which latter can be reduced for small stretching forces to give the Hook law: $h \cong \Theta\lambda e^{2\varepsilon/\Theta}$ (8). For $e^{-4\varepsilon/\Theta} \ll 1$ and $\lambda \neq 0$, $h = 2\varepsilon + \Theta \ln\sqrt{4\lambda^2/(1-\lambda^2)}$ (9). The isotherms of $h(\lambda)$ calculated from Eqs. (7), (8), and (9) are presented in Fig. 1. The calculated excessive value of λ_i (point of thermoelastic inversion), at which no further variation of the stretching force occurs when temperature is varied depends on the fact, that the chain already without an influence of f has a stretch λ_o. The "delayed" increase of h for $\lambda \to 1$ is due to cross-linking effects. For a molecular cluster of the length L which consists of chains of the length M and containing up to N links at uniform distances from each other, the relation

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$$\frac{1}{M\theta}h = \ln\frac{\lambda e^{2I} + \sqrt{\lambda^2 e^{4I} + 1 - \lambda^2}}{\sqrt{1-\lambda^2}} + $$
$$+ k\left\{\frac{1+\lambda^2}{1-\lambda^2} + \frac{1}{[\lambda^2(e^{4I}-1)+1][\lambda e^{2I} + \sqrt{\lambda^2 e^{4I} + 1 - \lambda^2}]} \times \right.$$
$$\left. \times \left(\frac{\lambda^2(e^{4I}-1)}{\sqrt{\lambda^2 e^{4I} + 1 - \lambda^2}} - \frac{1}{\lambda e^{2I} + \sqrt{\lambda^2 e^{4I} + 1 - \lambda^2}}\right)\right\}. \quad (13)$$

is derived for cross linking of the whole cluster, and, in special cases, is get from Eqs. (7) and (8): $(1/M)h = \lambda\theta e^{2I}(1+2k)$ (14) and $(1/M)h = 2\varepsilon + \theta\left\{\ln\sqrt{4\lambda^2/(1-\lambda^2)} + k\left[(1+\lambda^2)/(1-\lambda^2)^2\right]\right\}$ (15), respectively, $(k = 0.25\alpha(m/N)^2)$. The effect of cross linking is important in the region of maximum stretching. When a model is established, cross linking to form a cubic lattice is assumed to take place which is filled with a liquid-like substance. It is further supposed that the compression of the substance effected by elastic chains and intermolecular interaction is such that the total volume of the sample remains unchanged when its shape is altered.

The edge length of the elementary cube in absence of an external force is designated λ_o. When the cube is stretched by a force acting along a random edge up to $\lambda_{\parallel}$, the transverse edge is contracted to give $\lambda_{\perp} = \lambda_o^3/\lambda_{\parallel}$ (16). For the calculated force necessary for stretching up to $\lambda_{\parallel}$ and related to a longitudinal chain, it holds that $F_{\parallel} = h(\lambda_{\parallel}) - (\lambda_o/\lambda_{\parallel})^{3/2} h\sqrt{\lambda_o^3/\lambda_{\parallel}}$ (18) which may be reduced to give $F_{\parallel} = \Theta e^{2I}\lambda_o\left\{(\lambda_{\parallel}/\lambda_o) - \left[1/(\lambda_{\parallel}/\lambda_o)^2\right]\right\}$ (20); for small deformations, $F_{\parallel} = (3/2)\left[h(\lambda_o) + \lambda_o \partial h(\lambda_o)/\partial\lambda_o\right]\left[(\lambda_{\parallel} - \lambda_o)/\lambda_o\right]$ (19). Hence, the characteristic equation (18) relating deformation to applied force for both stretching and compression of rubber-like polymers has been obtained by using the representative model described. N. V. Vol'kenshteyn and Ptitsyn (Ref. 5: Konfiguratsionnaya statistika polimernykh tsepey (Configuration statistics of polymer chains), Izd. AN SSSR, 1959) are mentioned. There are 2 figures and 8 references: 2 Soviet and 6 non-Soviet. The three most recent references to English-language publications read as follows: G. E. Newell, E. W. Montroll, Revs. Mod. Phys. 25, 353, Application of the Ising model in...

S/190/61/003/011/001/016
B124/B101

1953; G. Gee, Trans. Faraday Soc. 42, 585, 1946; L. Huggins, J. Polymer Res., 1, 1, 1946.

ASSOCIATION: Fiziko-khimicheskiy institut im. L. Ya. Karpova (Physico-chemical Institute imeni L. Ya. Karpov)

SUBMITTED: May 3, 1960

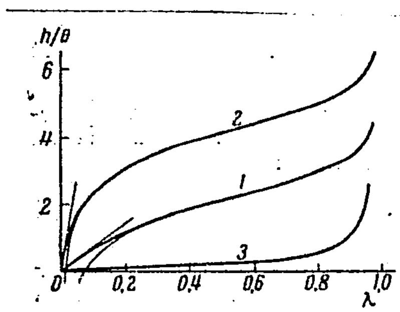

Fig. 1. Dependence of the stretching force on the relative stretching of individual chains with values of the parameter I = 1 (1) and I = 2 (2), and correction for cross-linking to a cluster for k = 0.1 (3).

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KVASNIKOV, L.A.

KULAGIN, Ivan Ivanovich, professor, doktor tekhnicheskikh; TYUTYUNOV, V.A., inzhener, retsenzent; KVASHIKOV, L.A., dotsent, kandidat tekhnicheskikh nauk, redaktor; SOKOLOV, K.I., inzhener, redaktor; BOGOMOLOVA, M.F., redaktor; ZUDAKIN, I.M., tekhnicheskiy redaktor.

[Theory of turbojet airplane engines] Teoriia aviatsionnykh gazoturbinnykh dvigatelei. Izd. 2-e, ispr. i dop. Moskva, Gos.izd-vo oboronnoi promyshlennosti, 1955. 406 p. (MLRA 8:10)
(Airplanes--Turbojet engines)

KVASNIKOV, L.A.

SINYAREV, Gennadiy Borisovich; DOBROVOL'SKIY, Mstislav Vladimirovich; POBEDONOSETS, Yu.A;, doktor tekhnicheskikh nauk, professor, retsenzent; KVASNIKOV, L.A., kandidat tekhnicheskikh nauk, redaktor; LOSEVA, G.F., redaktor; ZUDAKIN, I.M., tekhnicheskiy redaktor.

[Liquid-fuel rocket engines; theory and design] Zhidkostnye raketnye dvigateli; teoriia i proektirovanie. Moskva, Gos. izd-vo oboronnoi promyshl., 1955. 487 p. (MLRA 8:12)
(Rockets(Aeronautics))

SOV/147-58-4-10/15

AUTHORS: Kvasnikov, L. A., Tarasov, Ye. V. and Shakhurin, S. I.

TITLE: Boosting the Combustor of Gas Turbine Engines by Increasing the Temperature of the Combustion Gases (Forsirovaniye kamer sgoraniya gazoturbinnykh dvigateley po temperature gaza)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Aviatsionnaya tekhnika, 1958, Nr 4, pp 81-91 (USSR)

ABSTRACT: Alongside the major research problem pertinent to further development of the turbojet engine for use on aircraft flying at speeds substantially higher than the speed of sound by improvements of the compressor, diffusor and the nozzle, there exists also the smaller problem of a possible improvement of its performance by simply increasing the temperature of the gases at the exit from the combustion chamber (T_3). This, in turn, poses the problem of developing a combustor (and the turbine) capable of a stable operation over a large range of fuel-air conditions and at the same time maintaining a good efficiency of combustion throughout the range (and especially when rich mixtures are used). The object of this investigation was to analyze the possibility of

increasing the temperature T_3 up to 1400°K. Two independent parameters which affect the working process of the combustion chamber were investigated, viz: the admission of air along the axis of the combustor and the depth of penetration of the secondary air supply into the primary air stream. Experiments were carried out on three combustors: two variants with different air distribution and the fundamental, low temperature, combustor (which was a single burner flame tube of a serial production engine with the annular combustion chamber having the temperature of the exit gases of 1200°K). The second variant had a greater mass flow of the air in the forward zone of the combustor compared with the first variant. The working process in the combustor was assessed by measuring distribution of the temperature, velocity, concentration of the fuel, and the turbulence across several sections along the axis of the combustor. Boosting of the combustion chamber by increasing only the supply of fuel upsets the concentration at the flame front and leads to a poorer combustion and a longer flame tongue. Therefore, it is necessary also to increase the supply of air into the main part of the combustion chamber. With a constant air intake this means a redistribution of the air supply along the combustion chamber. Fig 1 shows the redistribution adopted in the experiments: full line represents the basic variant, dotted line - variant Nr 3. The experimental points were obtained by blowing the air through the combustion chamber (the coordinates give the relative values: mass flow of air: Gi/G_{total} and the position of the inlet holes for the secondary air: $\ell i/L_{total\ of\ com.chamber}$). The redistribution from the mixing zone into the combustion zone was arranged so that the mean coefficient of the excess of air at the end of the combustion zone (α) in both variants was the same (see Fig 2). Applying the method developed at the Chair of Aircraft Engines of the Moscow Aviation Institute, it is possible to determine approximately the layout of the flame tongue, so that choosing now the position of the radial openings in the liner for the secondary air supply, the problem of its penetration depth can be examined. Fig 3 shows the axial distribution of this penetration which was used in computations. The empirical formula for the depth of penetration of the secondary air flow is given on p 84, where: w_c is the inlet velocity (depending upon the pressure gradient, diameter of the holes and the stream velocity w_{CH}). As shown in Fig 4 pressure drop Δp does not remain constant along the axis of the combustor. In the annulus, the pressure of the secondary air increases slightly due to velocity drop, while in the flame tube pressure decreases on account of speed increase due to high temperatures and increased discharge. Hence, there appears to be a controlling section which will decide pressure distribution in the flame tube (in Fig 4 this is the station Nr 9). Varying now the number of holes and their diameter, the air flow-pressure along the combustor will be changed, and it is possible for the pressure inside the flame tube to be higher than outside in the secondary air stream so that the air will escape from the flame tube into the outer jacket (Fig 4). Having completed preliminary experiments on six different types of the flame tube, eventually only two variants were retained for further investigations, viz. the variant Nr 2 with 7 holes and the variant Nr 3 with 16 holes. The results of these investigations are given in Figs 5 to 10. Fig 5 shows the effect of the overall air excess coefficient $\alpha_{общ}$ on the coefficient of fullness of the combustion process. It is seen that combustion is improved in the variants 2 and 3 by the redistribution of the secondary air supply. This is even more obvious from Fig 6 where the temperature distribution is shown. Variant Nr 2 with a deeper penetration (at the same $\alpha_{overall} = 4.6$) by the secondary air than that of the variant Nr 3, produces higher temperatures in the first half of the combustor. As the mixture grows richer ($\alpha_{overall} = 3.2$) both variants produce about the same temperatures (i.e. the same degree of combustion) as shown in Fig 7. With a lean mixture ($\alpha_{overall} = 9$) - variant Nr 2 though still possessing a deeper penetration of the secondary air flow than that of the variant Nr 3, has a poorer degree of combustion. Fig 8 shows temperature distribution at the exit from the combustion chamber (dotted lines) for the variant Nr 3 at $\alpha_{overall} = 4.6$ and the inset shows the positions of the thermocouples. It is seen that the temperature falls with height. This temperature gradient affects adversely the strength of the turbine blades. By varying the number and diameter of the holes in the last two stations so that their total area remained unchanged, this temperature distribution was altered to that shown by the full line in Fig 8. Fig 9 shows the coefficient of turbulence $\varepsilon = (w'/w)$ (w' = pulsating component of the velocity w = stream velocity) across several sections in the basic combustor (full line) and variant Nr 3

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Boosting the Combustor of Gas Turbine Engines by Increasing the Temperature of the Combustion Gases

(dotted line), while Fig 10 shows the variation of this coefficient along the axis of the flame tube. There are 10 figures and 1 Soviet reference.

ASSOCIATION: Kafedra AD-1 (Chair AD-1), Moskovskiy aviatsionnyy institut (Moscow Institute of Aeronautical Engineering)

SUBMITTED: March 31, 1958

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KVASNIKOV, L.A.

11(1),26(1) PHASE I BOOK EXPLOITATION SOV/2391

Mikhaylov, Aleksandr Ivanovich, Georgiy Mikhaylovich Gorbunov, Vladimir Vladimirovich Borisov, Leonid Aleksandrovich Kvasnikov, and Nikolay Ivanovich Markov

Rabochiy protsess i raschet kamer sgoraniya gazoturbinnykh dvigateley (The Operation and Calculation of Combustion Chambers of Gas-Turbine Engines) Moscow, Oborongiz, 1959. 284 p. (Series: Moscow. Aviatsionnyy institut imeni Sergo Ordzhonikidze. Trudy, vyp. 106) Errata slip inserted. 3,610 copies printed.

Ed.: S.I. Bumshteyn, Engineer; Ed. of Publishing House: S. I. Vinogradskaya; Tech. Ed.: V.P. Rozhin; Managing Ed.: A.S. Zaymovskaya, Engineer.

PURPOSE: This book is intended for scientific workers and engineers engaged in designing combustion chambers of gas-turbine engines, and also for students in advanced courses in this general field.

Ca~~rd 1/6~~

The Operation and Calculation (Cont.) SOV/2391

COVERAGE: The book contains experimental data on the aerodynamic structure of flow in combustion chambers, hydraulic calculations for gas and air conduits, distribution of fuel in the gas flow, and the description of the equipment used in the investigation. On the basis of the experimental data obtained, an analysis of the operation of combustion chambers is given. The book also contains a description of hydraulic design and verification calculations for combustion chambers, the calculation of the structure of flow, and the calculation of the concentration of the fuel mixture. Chapter I was written by N.V. Inozemtsev, Chapters II, IV and V by G.M. Gorbunov, Chapter III by A.I. Mikhaylov, Chapter VI by V.V. Borisov, Chapter VII by N.I. Markov, V.V. Borisov, and E.L. Solokhin. Section 5 of Chapter III was partly written by L.A. Kvasnikov, who also contributed to Chapter V. The experimental work and the preparation of experimental data was done by G.G. Gakhun, E.L. Solokhin, S.I. Shakhwin, V.V. Polyakov, Yu. P. Rykov, A.I. Vinogradov, V.A. Golubev, Ye. V. Trofimova, and A. V. Garyacheva. There are 34 references, all Soviet.

Card ~~2/6~~

ACCESSION NR: AT4041481 S/2535/64/000/157/0051/0058

AUTHOR: Kvasnikov, L. A. (Candidate of technical sciences)

TITLE: Structure of the flow recirculation zone in the combustion chamber of an aviation gas turbine

SOURCE: Moscow. Aviatsionny*y institut. Trudy*, no. 157, 1964. Issledovaniya rabochego protsessa v kamerakh sgoraniya gazoturbinny*kh dvigateley (Studying the working processes of gas turbine engine combustion chambers), 51-58

TOPIC TAGS: jet aircraft, aviation turbine, combustion chamber

ABSTRACT: To evaluate the interaction between the main and recirculation flows, with pressure variations along the streamlines taken into consideration, a model of the gas flow in the recirculation zone of a gas turbine combustion chamber was developed. According to this model, the flow structure in the initial chamber section is determined by the formation of an annular vortex of the recirculation stream. The latter is deformed by the main stream flowing between the annular vortex and the chamber wall. The general principle of the method for

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ACCESSION NR: AT4041481

calculating the velocity profiles, pressure profiles, turbulence characteristics, and boundaries between the main and recirculation flows are discussed. Preliminary results indicate good agreement between calculated and experimental data. Orig. art. has: 5 figures and 6 formulas.

ASSOCIATION: none

SUBMITTED: 00 ATD PRESS: 3051 ENCL: 00

SUB CODE: PR, ME NO REF SOV: 004 OTHER: 000

Card 2/2

L 45867-66

ACC NR: AP6022408 (N) SOURCE CODE: UR/0317/66/000/002/0052/0054

AUTHOR: Kvasnikov, V. (Engineer; Lieutenant commander)

ORG: None

12
B

TITLE: Advantages of an "aggregate method"

SOURCE: Tekhnika i vooruzheniye, no. 2, 1966, 52-54

TOPIC TAGS: marine engineering, marine equipment, ~~naval force organization~~

ABSTRACT: The application of the so-called "aggregate method" to repairs of various naval engineering units is discussed. In using this method, the unit to be repaired is not dismantled or disassembled on the ship, but is removed and exchanged against a similar repaired unit taken from the naval base stock. Thus, the number of lay-days for repairing is considerably reduced. In some cases (overhaul of engines, compressors) the repair time is about three times shorter. The organization of exchange operations and building up a necessary stock of various repaired equipment is discussed and an example of statistical analysis for estimating the number of units to be kept in storage is presented. A further development and application of this new method is strongly recommended. Orig. art. has: 2 tables, 1 formula.

SUB CODE: 13/ SUBM DATE: None

Card 1/1 ULR

KVASHIKOV, V.F., otv. red.; RUSHCHINSKIY, M.V., otv. red.; KOROLEVA, T.I., red. izd-va; IL'INSKAYA, G.M., tekhn. red.

[Research on rock pressure] Issledovaniia gornogo davleniia. Moskva, Gos.nauchno-tekhn. izd-vo lit-ry po gornomu delu, 1960. 446 p. (MIRA 14:5)

1. Akademiya nauk SSSR. Institut gornogo dela.
(Rock pressure)

KVASNIKOV, V.I. (Moskva); LIKHACHEV, A.N. (Moskva)

Teaching the grafting technique by the use of maple scions.
Biol. v shkole no.1:84 Ja-F '63. (MIRA 16:6)

(Grafting--Study and teaching)

KVASNIKOV, V.I.

Studying the seeds of monocotyledonous plants with caryopsis of corn as a model. Biol. v shkole no.3:88 My-Je '63. (MIRA 16:10)

1. Shkola No.189, Moskva.